Patent Claims:

1. A chemical sensor comprising one or more sensor units, a primary and a secondary substrate, the primary substrate comprises a primary cavity and a primary connecting surface at least partly surrounding said cavity, the one or more sensor units are in the form of cantilevers, each comprising a piezoresistive element, said one or more sensor units are protruding from the primary substrate and into the cavity of said primary substrate, the piezoresistive element or elements being electrically connected to primary connecting pads on the primary connecting surface, the secondary substrate comprises secondary connecting pads corresponding to the primary connecting pads, on a secondary connecting surface corresponding to the primary connecting surface, said primary connecting surface and said secondary connection surface being mounted to each other so that said primary connecting pads and said secondary connecting pads being direct mounted to each other, preferably in a flip chip mounting.

2. A chemical sensor according to claim 1 wherein the sensor has one cantilever protruding from the primary substrate, the connecting surface of the primary surface totally surrounds the primary cavity, and the secondary substrate comprises an opening through the substrate to provide access to the cantilever.

3. A chemical sensor according to claim 2 wherein the sensor has two or more cantilevers, each cantilever has its own primary cavity, the connecting surface of the primary surface totally surrounds the cavities of the

primary surface, and the secondary substrate comprises openings through the substrate to provide access to the cantilevers.

4. A chemical sensor according to any one of the preceding claims wherein the primary cavity is in the form of a primary channel section, said primary channel section preferably extending perpendicular to the protruding direction of the cantilever(s).

5. A chemical sensor according to claim 4 wherein the primary connecting surface is constituted by the surface along the lengthwise borders of the primary channel section.

6. A chemical sensor according to claim 4 wherein the primary connecting surface is constituted by the surface along all of the borders of the primary channel section.

7. A chemical sensor according to any one of the claims 4-6 wherein the secondary substrate comprises a secondary channel corresponding to the primary channel so that the primary and the secondary channels together form a flow channel section.

8. A chemical sensor according to claims 7 wherein the flow channel section is closed except from an inlet in one of its ends and an outlet in the other one of its ends.

9. A chemical sensor according to claim 7 wherein the flow channel section comprises one or more openings through either the primary or the secondary substrate.

10. A chemical sensor according to claim 6 wherein the primary channel section is in the form of an oblong cavity, the secondary substrate comprises an oblong opening corresponding to the primary channel section, the primary connecting surface surrounding the primary channel section and the secondary connection surface along the oblong opening being mounted to each other to form a flow channel section.

11. A chemical sensor according to any one of the claims 4-10 wherein the sensor comprises two or more cantilevers protruding from the primary substrate along the length of the primary channel section.

12. A chemical sensor according to any one of the preceding claims wherein the primary connecting surface comprises a barrier line extending partly or totally around the primary cavity, said barrier line being in the form of a barrier wall, a barrier ditch or both a barrier wall and a barrier ditch.

13. A chemical sensor according to any one of the preceding claims wherein the secondary connecting surface comprises a cavity or an opening in the secondary substrate, said secondary substrate further comprising a barrier line extending partly or totally around the cavity or the opening in the secondary substrate, said barrier line preferably being of a metal.

14. A chemical sensor according to any one of the preceding claims wherein the primary and the secondary connection surfaces are sealed in a liquid tight sealing.

15. A chemical sensor according to claim 14 wherein the liquid tight sealing comprises metal e.g. a metal sealing ring, polymer, glue or mixtures thereof.

16. A chemical sensor according to any one of the claims 14 and 15 wherein the liquid tight sealing is totally or partly provided by soldering.

17. A chemical sensor according to any one of the claims 14-16 wherein the liquid tight sealing is totally or partly provided by underfilling, such as by underfilling of a polymer e.g. Silicone and epoxy resin.

18. A chemical sensor according to any one of the preceding claims wherein the secondary substrate comprises electrical communication lines capable of providing an electrical connection between a power supply and the piezoresistive element(s), to thereby apply a voltage over the piezoresistive element(s).

19. A chemical sensor according to any one of the preceding claims wherein the secondary substrate is of a ceramic material such as, alumina, mullite, glass, silicon, an epoxy material such as FR-4 or FR-5 epoxy glass, and combinations thereof.

20. A chemical sensor according to any one of the preceding claims wherein the secondary substrate is a printed circuit board, said printed circuit board preferably comprises one or more integrated flow channels, such as gas flow channels and/or liquid flow channels, preferably liquid flow channels.

21. A chemical sensor according to any one of the preceding claims wherein the secondary substrate is a micro chip.

22. A chemical sensor according to any one of the preceding claims wherein said primary substrate comprises one or more of the materials selected from the group consisting of silicon (including polysilicon and single crystal silicon), silicon nitride, silicon oxide, metal, metal oxide, glass and polymer, wherein the group of polymers preferably includes epoxy resin e.g. an octafunctional epoxidized novalac, polystyrene, polyethylene, polyvinylacetate, polyvinylcloride, polyvinylpyrrolidone, polyacrylonitrile, polymethylmetacrylate, polytetrafluoroethylene, polycarbonate, poly-4-methylpentylene, polyester, polypropylene, cellulose, nitrocellulose, starch, polysaccharides, natural rubber, butyl rubber, styrene butadiene rubber and silicon rubber.

23. A chemical sensor according to claim 22 wherein said primary substrate is based on silicon, said primary cavity being in the form of an etched cavity forming a recess under the one or more cantilever(s).

24. A chemical sensor according to any one the preceding claims wherein the piezoresistive element consists of one or more of the materials silicon (including polysilicon and single crystal silicon), metal or metal containing composition, e.g. gold, AlN, Ag, Cu, Pt and Al conducting polymers, such as doped octafunctional epoxidized novalac e.g. doped SU-8, and composite materials with an electrically non-conducting matrix and a conducting filler, wherein the filler

preferably is selected from the group consisting of polysilicon, single crystal silicon, metal or metal containing composition, e.g. gold, AlN, Ag, Cu, Pt and Al, semi-conductors, carbon black, carbon fibres, particulate carbon, carbon nanowires, silicon nanowires.

25. A chemical sensor according to any one the preceding claims wherein said one or more cantilevers comprise a capture surface of at least one of its major surfaces.

26. A chemical sensor according to any one the preceding claims wherein the sensor comprises a grounded electrode to ground the potential of a conductive fluid in one or more of the cavities of the primary substrate.